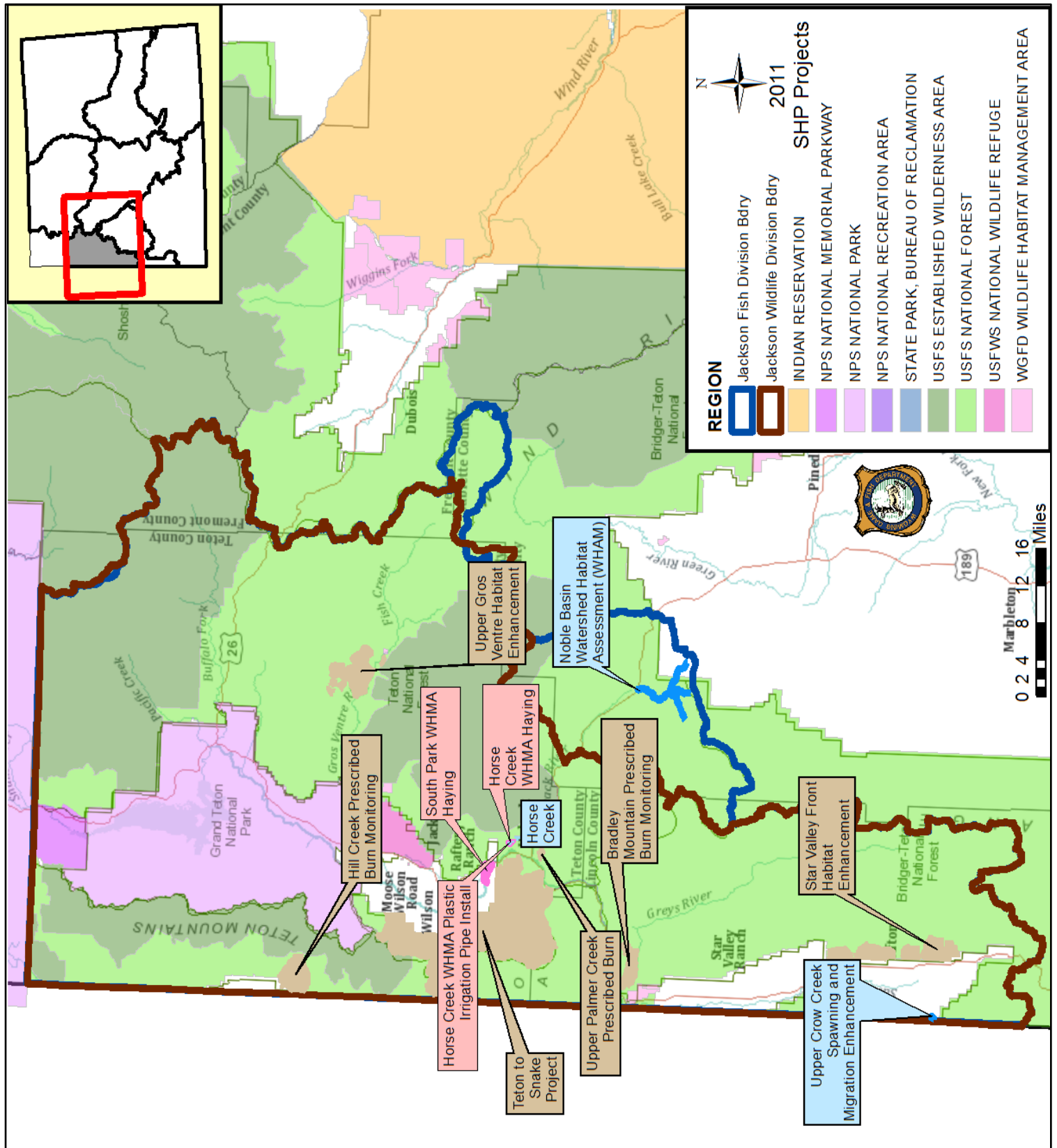


JACKSON REGION



JACKSON REGION HIGHLIGHTS

- 11 miles of stream habitat assessments
- Installed 7 instream structures to restore stream form and function
- Removed two fish passage barriers
- Installed 4 troughs, 1 water well and 1 pipeline to provide water to uplands
- 27,534 acres mapped and prioritized for habitat treatments in the Star Valley Front and Teton to Snake project areas
- Jackson Moose Research Project Phase II completed (M.S. Thesis available through Wyoming Cooperative Research Unit) indicating summer range quality may be limiting population growth
- Over 17,000 acres of bighorn sheep, elk, moose, and mule deer habitat received wildfire that was managed for resource benefit on federal lands
- Horse Creek and South Park WHMAs were both hayed
- One mile of plastic irrigation pipe was installed on Horse Creek WHMA

Noble Basin Watershed Habitat Assessment (WHAM) (Goal 1) – Jill Randall and Lara Sweeney Gertsch

A WHAM Level 1 reach inventory, riparian greenline and beaver dam inventory were established on Muddy Creek and Coyote Gulch prior to Plains Exploration and Production Company (PXP) Drilling Environmental Analysis. In 2007, PXP approached the Forest Service for permits to begin drilling the Noble Basin, an area in the northern Wyoming Range in the Hoback River watershed that overlaps the Jackson and Pinedale Regions. The company seeks to drill 136 wells and plans to use “fracking” to extract natural gas. Fracking is a nickname for hydraulic fracturing. Water and chemicals are pumped into a well at high pressure to split open rock and stimulate increased gas flow.

The proposed plan will upgrade existing roads, construct new roads, drill 136 wells from 17 drill pads and construct gas and liquids gathering lines and facilities. This development site is expected to be in production for more than 30 years. Development would occur in two phases: an exploratory phase with the construction of three wells on one well pad over the course of two years and a development phase where the remaining 133 wells would be constructed on six well pads.



Figure 1. Aspen stand photo point for baseline data before PXP project.

As part of its SHP, the WGFD has prioritized the Upper Hoback watershed as a “crucial habitat area” for aquatic habitat. According to the SHP, “crucial habitats have the highest biological values, which should be protected and managed to maintain healthy, viable populations of terrestrial and aquatic wildlife. These include habitats that need to be maintained, as well as habitats that have deteriorated and should be enhanced or restored.”

The WHAM Level 1 inventory documented many current and historic beaver dams in the streams of Noble Basin (Figure 1). Run-off during 2011 was unusually high and

caused the failure of many dams on the lower end of the watershed and beaver abandoned the dams. Aspen stands in the proposed development were documented with photos (Figure 2). A riparian greenline was established within the Muddy Creek floodplain. Further Noble Basin baseline data will be collected during the 2012 season with the intent of inventorying the headwaters of Muddy Creek. Additional information can be found in the WGFD WHAM and Photo databases.



Figure 2. An active beaver dam on Coyote Gulch. Active and abandoned beaver dams are abundant in Noble Basin.

Upper Gros Ventre Habitat Enhancement (Goal 2) – Alyson Courtemanch

WGFD and USFS habitat managers continue to conduct surveys and plan for habitat treatments within the Upper Gros Ventre project area (Figure 3), despite the project currently being on hold due to the Canada Lynx Forest Plan Amendment. The objective of this project is to improve elk, moose and bighorn sheep winter range by applying prescribed fire to aspen and conifer communities and to complement the Lower Gros Ventre prescribed burn, which is scheduled for completion in 2012. In 2007, a habitat inventory was used to habitat-type a 29,612 acre area between Slate Creek and Cottonwood Creek. Certain elements necessary for NEPA have been initiated and the WGFD provided a \$15,000 grant to the BTNF for NEPA development. Cover board measurements and snowshoe hare pellet surveys have been conducted for the past three years (2009-2011) to refine treatment recommendations and assess compliance with the Canada Lynx Forest Plan Amendment. Numerous areas proposed for treatment have exceeded the horizontal cover-board threshold of 48% for snowshoe hare habitat. However, consistently low densities of pellets were found in most of these areas. These surveys will continue next year and will hopefully contribute to a future decision by the USFS in consultation with USFWS on whether or not this project can move forward.

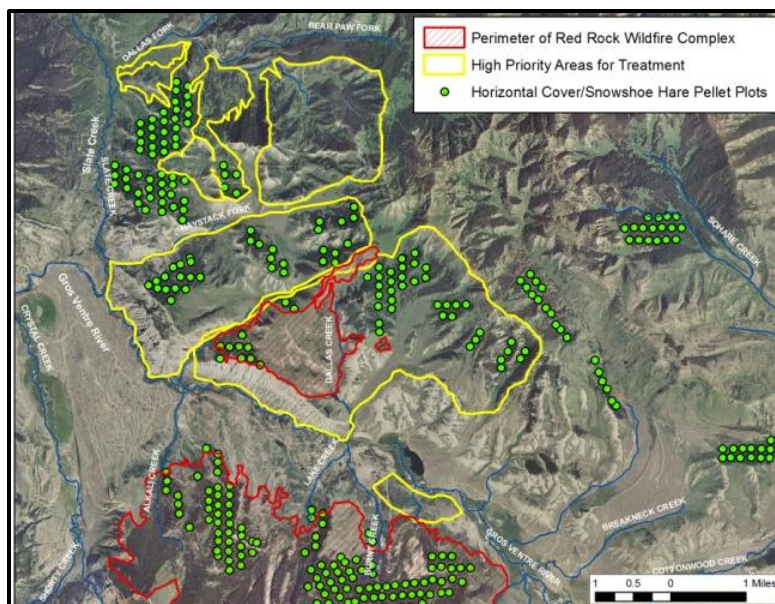
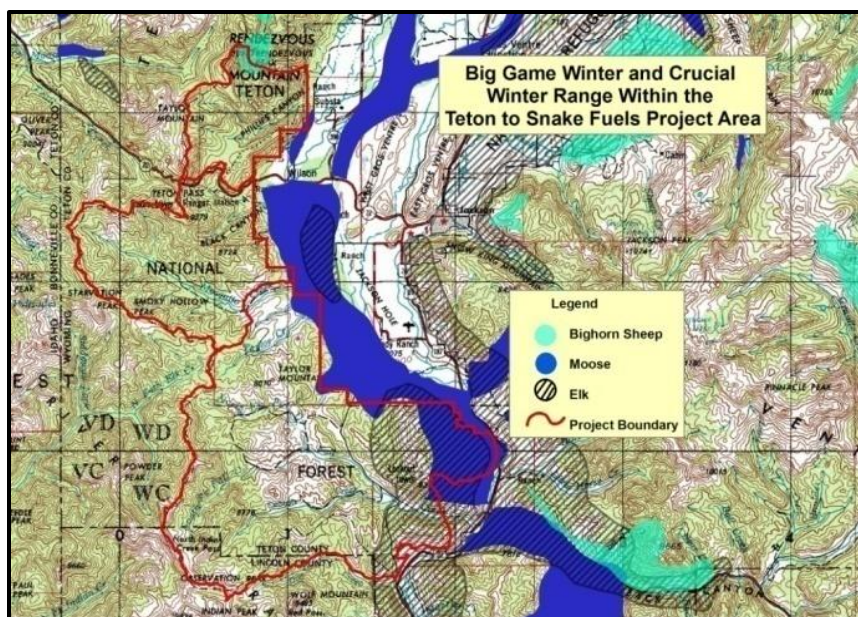


Figure 3. Upper Gros Ventre project area with highest priority treatment areas shown. The Red Rock wildfire burned a portion of the project area in 2011.

One success in the project area this year was the Gray Hills Wildfire, which burned approximately 2,468 acres (part of the Red Rock Fire complex). The willingness of BTNF managers to take on and manage this wildfire is commendable and the WGFD supported the effort. The wildfire successfully burned portions of bighorn sheep and elk crucial winter range and moose winter/year-long range in the Upper Gros Ventre project area.

Teton to Snake Project (Goal 2) – Alyson Courtemanch

The Jackson Ranger District of the BTNF is proposing to conduct prescribed burning and non-commercial thinning in wildland-urban interface areas around Jackson to modify potential fire behavior, set back succession, and enhance aspen communities on approximately 22,511 acres (within a larger 79,000 acre project area). The project area includes important wildlife habitats along the west side of the Snake River from Teton Village south to Hoback Junction (Figure 4).



Past fire suppression has moved the landscape within the project area toward an advanced vegetation succession state with decreased age-class diversity. Vegetation age-class diversity generally results in increased landscape stability and resistance to catastrophic events associated with fire, disease and insect infestations. A minimum of 198 fires were suppressed in the project area between 1953 and 2007 (an average of four fires/year). Moreover, four fires were suppressed within the project area in 2010. Past fire suppression has resulted in many conifer-encroached aspen stands that exhibit little to no regeneration.

Figure 4. Designated big game winter, summer and transitional ranges adjacent to and within the Teton to Snake Fuels Management Area.

The proposed treatments will generally enhance habitats for wild ungulates, especially moose and bighorn sheep. Recent location data from GPS-collared bighorn sheep in the Teton Range indicate bighorn sheep are using areas adjacent to and within the proposed prescribed burn units (Figure 5). Prescribed burning would enhance bighorn sheep habitat in this area by removing conifer encroachment and improving forage quality of grasses and forbs.

In 2010, the WGFD granted funding to the Forest Service to help support information collection required by NEPA. This funding has been used to conduct sensitive species surveys and habitat modeling, including for goshawks. The funding has also been used to identify and map aspen stands

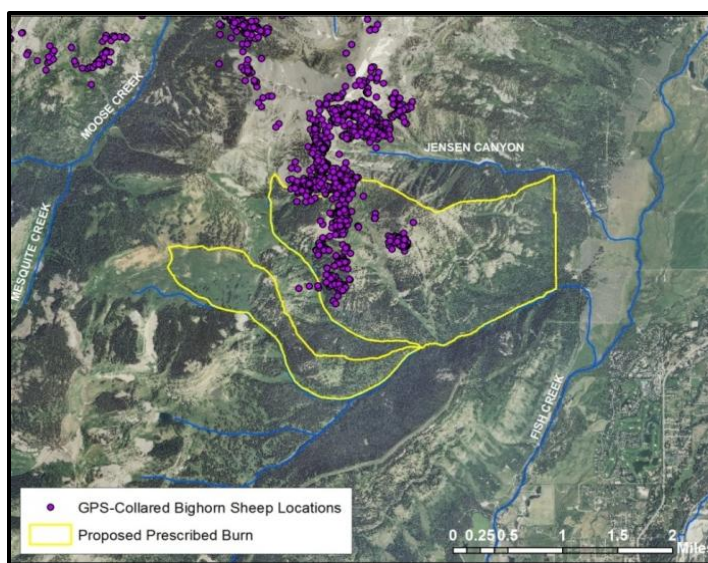


Figure 5. GPS-collared bighorn sheep locations in a proposed prescribed burn area in the BTNF Teton to Snake project, near Jensen Canyon.

that would benefit from prescribed fire or mechanical thinning. During summer 2011, WGFD, Teton Science Schools-Conservation Research Center (TSS-CRC) and BTNF personnel mapped, habitat-typed and assigned treatment priorities to aspen stands on more than 5,000 acres of the project area. More than 50% of aspen stands were classified as moderate to high priority for treatment, based on the amount of conifer or sagebrush encroachment and lack of self-regeneration. These mapping efforts will continue in summer 2012 to help the BTNF in prioritizing aspen stands for prescribed burns. Public scoping has been completed for the project, including comments from the WGFD, and the Environmental Assessment is expected to be available for public comment in spring 2012.

Upper Crow Creek Spawning and Migration Enhancement (Goal 2) – Lara Sweeney Gertsch
Crow Creek is a tributary to the Salt River. The WGFD is working with landowners, NRCS and the Star Valley Conservation District to promote watershed function and ecosystem integrity by enhancing the quality and diversity of aquatic habitats. Enhancing Snake River cutthroat trout spawning and migration and habitat function in Salt River tributaries is an ongoing watershed effort. The Upper Crow Creek Spawning and Migration Enhancement Phase 2010 Project objectives are to provide sustainable pools, overhead cover, spawning habitats and migration routes for native Snake River cutthroat trout.

The project is located four miles southwest of Fairview and approximately ½ mile east of the Idaho state line. The first two phases of the Upper Crow Creek Spawning and Migration Enhancement Project were installed during the falls of 2008 and 2009. Two rock cross-vane structures, two barb structures and six tree revetments were placed to enhance overhead cover and maintain stream form. Washed gravels were added for spawning habitat. Pools were excavated to enhance meander pattern and improve trout habitat.

Upper Crow Creek Spawning and Migration Enhancement Phase 2010 is directly downstream of the first two phases. This reach is enrolled in the WGFD's Private Land Public Wildlife Program (PLPW) for angler access. Currently, the stream has minimal habitat diversity. There are few pools and riffles and little overhead cover. The stream bottom and spawning gravels are inundated with sediment. Installing instream rock habitat structures, dredging sediments, building riparian fence, planting streambank willows, creating water gaps and installing a new water well and pipelines are planned.

In October of 2011, the upland watering system was installed (Figure 6). A well was drilled on the north side of Crow Creek, the pipeline was dug and multiple troughs were attached to the pipeline. Two troughs were installed on the north side of Crow Creek and two troughs on the south side to disperse grazing among the three landowners and five pastures. The project partners strategically installed angler access gates (Figure 7). This fencing assists three landowners in managing their horse pastures with a rest/rotation system.



Figure 6. Installation of the pipe used to supply water to upland livestock troughs.



The new system will improve aquatic and riparian wildlife habitat, while at the same time enabling the landowners to manage their pastures with a rest/rotation system. Livestock will be excluded from the riparian pasture until newly planted trees and shrubs become established or after five years of grazing rest.

Figure 7. The gate provides angler access to this PLPW reach of Crow Creek.

Horse Creek Wildlife Habitat Management Area (WHMA) WHAM (Goal 2) – Lara Sweeney Gertsch

A WHAM Level 1 reach inventory was conducted within the Horse Creek WHMA. The inventory identified future assessment needs and enhancement projects. Cottonwood galleries in the drainage have no recruitment of younger age classes (Figure 8). A culvert may be a fish passage barrier and is destabilizing the stream channel (Figure 9).



Figure 8. Upland view of Horse Creek WHMA and the cottonwood galleries.



Figure 9. Road culvert on Horse Creek that is a likely fish passage barrier.

Horse Creek WHMA and South Park WHMA Meadows (Goal 2) – Matt Miller, Kade Clark

The lower 60 acre meadow on Horse Creek WHMA was irrigated numerous times from June through August. The grass meadows on the Horse Creek and South Park WHMAs were then hayed in 2011 (Figure 10). Haying occurred to create better late fall and early winter forage for elk as they start heading into the feedgrounds. In the past, the grass would grow tall and become dead and decadent after the first snow fall. The Horse Creek WHMA was irrigated after haying and approximately 12" of fresh regrowth occurred across the meadow. The two WHMAs produced 150 tons of hay, which will be fed out on the Horse Creek Feedground (Figure 11).



Figure 10. Horse Creek WHMA meadows prior to haying.



Figure 11. Loading hay on South Park WHMA.

Star Valley Front Habitat Enhancement (Goal 2) – Alyson Courtemanch

The Greys River Ranger District of the BTNF is proposing to implement prescribed burn treatments within a 24,963 acre project area along the Star Valley Front. The project area is east of Afton and extends from Smoot north nearly to Turnerville. The main objectives of the project are: 1) return the area to its natural fire regime by creating a balance of vegetation age classes in mountain shrubland, sagebrush, aspen and conifer communities; 2) improve vegetation quality and vigor on mule deer and elk crucial winter, winter/year-long and transitional range; and 3) reduce fuel loading in the wildland-urban interface. Burn units within the project area have been drafted and are in part drawn to treat areas in mule deer crucial winter and winter/year-long range recommended by the WGFD for treatment since the mid-1980s. Burn units will be treated on a rotational basis given the importance of the habitat for wintering mule deer, elk and moose. The WGFD was heavily involved in project planning and field data collection in 2011.



Figure 12. Example of aspen stands with encroaching conifers in the Star Valley Front project area.

A WGFD grant to BTNF for \$67,500 was approved in 2010 to conduct data collection associated with NEPA requirements, including goshawk

surveys and a habitat assessment completed by the TSS-CRC. Goshawk surveys were completed in summer 2011 and the final report for the habitat assessment will be available in March 2012. The TSS-CRC habitat assessment mapped 22,405 acres in the project area and included habitat-typing, assigning fuel models to patches, collecting samples from fire-scarred trees, aging forest stands and prioritizing aspen stands for treatment (Figure 12). Major findings of the habitat assessment include: 1) approximately 80% of the project area is currently in late succession; 2) only 221 acres out of approximately 3,900 acres of aspen were classified as properly functioning (6%); 3) samples from fire-scarred trees showed the last evidence of a wildfire was over 70 years ago (around 1941); 4) historically, natural fires played a role in the project area; and 5) fire scars indicate that prior to 1941 the mean fire return interval was approximately 75 years.

The TSS-CRC habitat assessment provided needed information about the vegetation succession status in the project area and will aid managers in prioritizing treatment areas. Project planning and collaboration between the WGFD and Forest Service will continue in 2012 with potential implementation of the first phase of the project in 2013 or 2014.

Upper Palmer Creek Prescribed Burn (Goal 2) – Alyson Courtemanch

The 360-acre Upper Palmer Creek prescribed burn was implemented in September 2011. The project area is located near Hoback Junction in the wildland-urban interface area south of Jackson. The vegetation consists mainly of sagebrush, with several forested draws where aspen and Douglas-fir are succeeding to mixed conifer. The primary objective of the prescribed burn was to reduce fuel loading in the wildland-urban interface area. However, the Forest Service cooperated with the WGFD to also design the project to enhance wildlife habitat. The area is moose and mule deer crucial winter/year-long range and elk winter/year-long range. Project objectives included: 1) blacken between 40% and 80% of the sagebrush in the burn unit, in a mosaic pattern; 2) achieve at least 40% conifer mortality in encroached sagebrush areas; 3) attain more than 3,000 aspen suckers/acre in the designated aspen stands two years post burn; 4) attain at least 1,000 aspen stems/acre at 10 ft. or taller within 15 years post treatment and; 5) maintain aspen browse levels at less than 30% on terminal leaders.

Approximately 73% of the project area received fire (263 acres), and 81% of the sagebrush burned, which slightly exceeded the project objective (Figure 13). Objectives related to conifer mortality, aspen regeneration, browse levels, and sagebrush cover will be measured beginning in 2012 (one year post-burn).

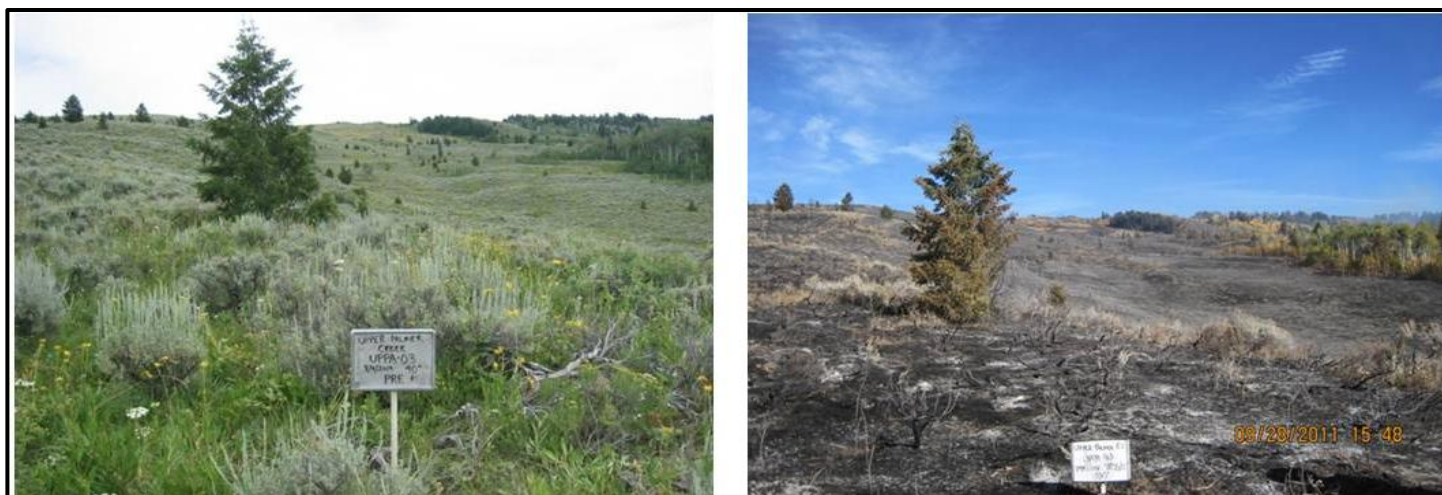


Figure 13. Sagebrush unit in the Upper Palmer Creek project area before and immediately after the prescribed burn.

Eastside Canal Fish Passage (Goal 2) – Lara Sweeney Gertsch

The Salt River Corridor is a WGFD Aquatic Habitat Priority Enhancement Area. The Eastside Canal Diversion (Figure 14) is located on the Wyoming Game and Fish Commission's Diversion Dam Public Access Area on the Salt River and historically was a formidable barrier to fish migration. Trout Unlimited led the construction of a



Figure 14. The Eastside Canal Diversion prior to project implementation. This diversion blocks native fish migration in the Salt River.



Figure 15. The East Side Canal Diversion fish ladder (looking upstream) on the Salt River.

“rock-ramp” fish ladder (Figure 15) on the south side of the diversion structure to provide a low-velocity, low-gradient area passable by the Snake River cutthroat trout, bluehead sucker and mountain sucker native to the Salt River.

Oversight, design, permitting, supplies, and installation of the rock ramp fish ladder was funded by the Bureau of Reclamation, WY Wildlife and Natural Resource Board and the USFS Resource Advisory Committee.

Nickel Spring Creek Fish Passage (Goal 2) – Lara Sweeney Gertsch

Low gradient spring fed streams are integral to the natural recruitment of native trout. Nickel Spring is a tributary to Flat Creek within the Salt River watershed. The Salt River is a fishery of regional importance. Prior to 2008, this spring creek was located in a livestock corral. The landowner and NRCS removed the corral and designed a stream enhancement project to provide Snake River cutthroat spawning and juvenile habitat the length of the spring creek. The initial plans did not include replacing the culvert that connects 1,000 feet of Nickel Spring to the planned habitat work. However, on further examination, it was clear that two undersized culverts (Figure 16) needed to be replaced with one larger culvert to provide native fish passage



Figure 16. Removed culverts from the Nickel Spring road crossing were undersized and inhibited fish passage.

and accommodate the flows and floodplain. The NRCS stream improvements, including dredging, narrowing of certain reaches and willow plantings, were implemented in August. The flat bottomed culvert was delivered to the site in the spring and installed in October (Figure 17). The area will be monitored during the 2012 spawning season.



Figure 17. A flat bottom culvert replaced the corrugated Nickel Spring culvert. The bottom of the culvert was later covered with cobble and gravel to promote passage.

Tin Cup Creek Stream Enhancement (Goal 2) – Lara Sweeney Gertsch

The Jackson Aquatic Habitat Biologist assisted the Star Valley Conservation District with an emergency flood project on Tin Cup Creek, a Salt River tributary (Figure 18). The 2011 runoff flooded the landowner's pastures and outbuildings and drowned 14 calves.

The Star Valley Conservation District designed a rip-rap stabilization and relocation of the cattle feeding area. The original rip-rap design was modified to include instream rock structures that provide a long term fix to the erosion and stream instability. Two vanes were strategically placed to maintain form and function and enhance Snake River cutthroat trout habitat (Figure 19).



Figure 18. Tin Cup Creek at high flows flooded pasture and outbuildings and drowned livestock.



Figure 19. The rip-rap design for the flood control project was modified to include rock structures that divert flows away from the eroded bank and into the willowed riparian floodplain.

Bradley Mountain Prescribed Burn Monitoring (Goal 2) – Alyson Courtemanch

The Bradley Mountain prescribed burn was completed in two stages in the spring and fall of 2009. The project area was 3,271 acres on the south-facing slopes of a long ridge that separates the Snake River Canyon from the mouth of the Greys River, near Alpine, Wyoming. The vegetation consists of mountain shrubs, aspen and mixed conifer. Post-burn monitoring was completed by the BTNF Interagency Fire Effects Monitoring Crew in 2010 and 2011. Project objectives included: 1) treat 30-60% of the project area with a focus on high and moderate priority areas and 2) attain 10-foot tall aspen sucker density of at least 1,000 stems per acre at or before 15 years post-burn.

Post-burn mapping showed that 46% of the project area was burned, meeting the first objective. High and moderate priority areas, including aspen stands and mountain shrubs, were successfully targeted with the prescribed burn (Figure 20). Aspen regeneration in 2011 was approximately 3,600 stems/acre, combined with only 2% browsing (Figure 21). If browsing does not increase significantly in the future, we should achieve the objective of 1,000 ten-foot tall stems/acre 15 years post-burn. Vegetation monitoring is scheduled to continue for this project to determine whether objectives are achieved over the long-term. Funding for the prescribed burn was provided by WWNRT, RMEF, WGBGLC and WLCI, with considerable in-kind support from BTNF and the WGFD.



Figure 20. Photos of an aspen stand in 2006 prior to a prescribed burn (left) and two years post-burn (right) within the Bradley Mountain area.

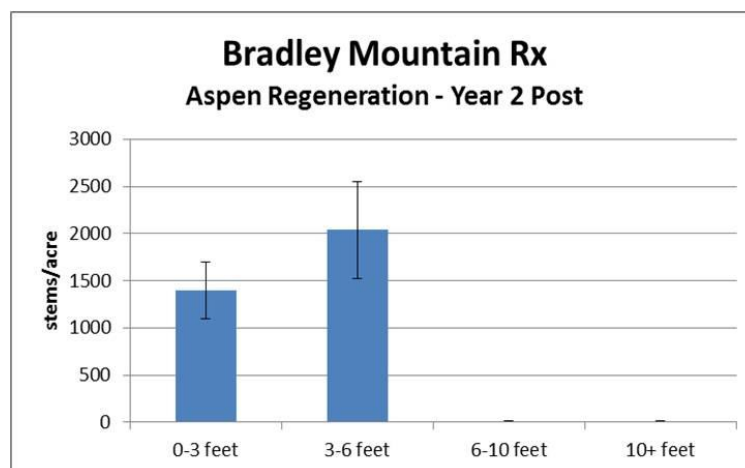


Figure 21. Aspen regeneration measured two years post-burn in the Bradley Mountain project area.

Horse Creek WHMA Plastic Irrigation Pipe Install – (Goal 2)

Approximately one mile of plastic irrigation pipe (PIP) was installed on the Horse Creek WHMA (Figure 22). The PIP was buried in an irrigation ditch and will allow for more water to reach the lower ends of the WHMA while irrigating each summer (Figure 23). The ability to irrigate the lower ends of the Horse Creek WHMA meadow will allow for more productive regrowth after haying.



Figure 22. Installing buried irrigation pipe on Horse Creek WHMA.



Figure 23. Preparing ditch for buried irrigation pipe on Horse Creek WHMA.

Interagency Wildfire Benefit/Threat Assessment (Goal 5) – Alyson Courtemanch, Ben Wise, Jill Randall

The BTNF initiated an interagency effort in 2011 to conduct a forest-wide wildfire benefit/threat assessment. This effort involves participation from multiple agencies to identify resources on the landscape that would either be positively or negatively impacted by wildfires at varying levels of intensity. One of the products from this interagency effort will be a forest-wide map showing areas that would be cumulatively benefited or threatened by a wildfire. This type of product is critical for fire managers, district rangers and the forest supervisor when making decisions about whether or not to manage natural ignition wildfires for resource benefit.

Wildlife habitat information is a key component of this project. WGFD personnel began preparing wildlife information for this assessment in late 2011 and will continue in 2012.

Hill Creek Prescribed Burn Monitoring (Goal 2) – Alyson Courtemanch

Caribou-Targhee National Forest completed phase one of the Hill Creek prescribed burn project in 2008 (Darby Unit – 1,583 acres) and phase two in 2010 (Rapid Creek Unit – 1,624 acres). The final phase is scheduled for completion in fall 2012 (Hill Creek Unit – 2,051 acres) (Figure 24). The project area is located along the base of the west slope of the Teton Range, approximately six miles southeast of Driggs, Idaho. The area consists of important moose, elk and mule deer transition and winter range. The main objective of these burns was to set back succession in aspen/conifer and mountain shrub communities. A specific objective was to attain at least 1,000 ten-foot tall aspen stems/acre within 10 years post-burn. Aspen regeneration monitoring was completed for the Rapid Creek Unit in 2011 and measured an average of 3,000 aspen stems/acre at one year post-burn (Figure 25). Unless ungulate browsing increases significantly, the objective of 1,000 ten-foot tall stems/acre at 10 years post-burn can be achieved. Monitoring will continue in future years to track the

success of the project. Funding for the prescribed burns has been provided by WWNRT, RMEF and CTNF, with in-kind support from the WGFD and CTNF.

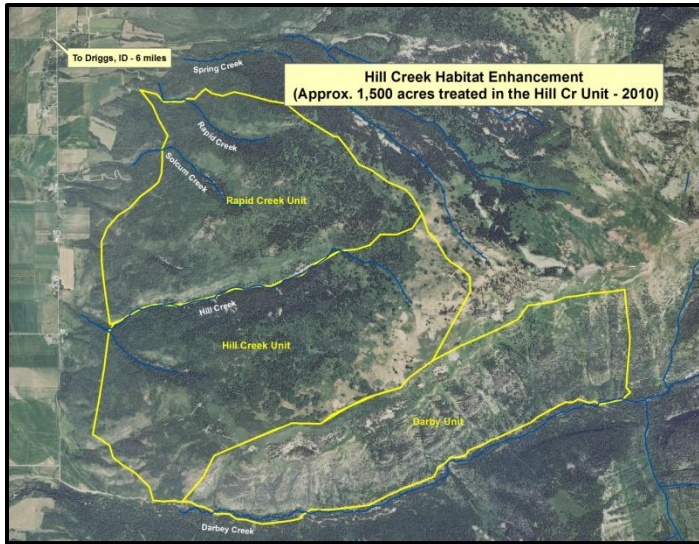


Figure 24. Hill Creek prescribed burn project area. The Darby Unit was completed in 2008 and the Rapid Creek Unit in 2010. The Hill Creek Unit is scheduled for completion in 2012.

Figure 25. Aspen stand in the Rapid Creek Unit at one year post-burn.

Wildfires Managed for Resource Benefit (Goal 5) – Alyson Courtemanch

In 2011, the BTNF successfully managed two large-scale wildfires in the Jackson Region for resource benefit. The Red Rock Fire Complex burned 12,138 acres in the Gros Ventre drainage, including bighorn sheep, moose and elk crucial winter, winter/year-long and transitional range and migration routes (Figure 26). The



Figure 26. Areas burned along a bighorn sheep migration route by the Red Rock Fire in the Gros Ventre drainage.

The Nowlin Fire burned 4,686 acres in the Teton Wilderness, including moose and elk summer and transitional range. These fires produced mosaics of patches of burned areas with varying fire intensity and unburned areas. As planned habitat treatments have become increasingly difficult in the Jackson Region due to the Canada Lynx Forest Plan Amendment, supporting wildfire management is one way the WGFD can work with the Forest Service to improve wildlife habitat. Due to decades of wildfire suppression, much of the landscape in the Jackson Region is in an advanced successional state.

Wildlife Habitat Management Areas (Goal 2) – Ray Bredehoft, Matt Miller, Kade Clark

- On Greys River WHMA, approximately 13 miles of elk fence was contracted with funding provided by the Legislature. The Horse Creek and Greys River elk fences were maintained. The fences were walked and ridden on horseback or 4-wheeler. All downed trees on the elk fence were removed and holes or damage in the fences repaired (Figure 27).
- Noxious weed control was completed on all the WHMAs in the Jackson Region.



Figure 27. Replacing a section of elk fence on a WHMA.

Jackson Moose Research – Phase II (Goal 5) – Alyson Courtemanch

Phase II of the Jackson Moose Research Project was completed in December 2011 by master's student Janess Vartanian at the Wyoming Cooperative Research Unit, University of Wyoming. Vartanian's thesis, titled "Habitat Condition and the Nutritional Quality of Seasonal Forage and Diets: Demographic Implications for a Declining Moose Population in Northwest Wyoming" provided important information for the WGFD on moose habitat and population trends for the Jackson moose herd. Phase I of this research was completed by Scott Becker in 2008, also at the Wyoming Cooperative Research Unit, and indicated habitat quality was likely limiting the growth of the Jackson moose population. Vartanian's study was designed to build on Becker's results and investigate the winter and summer habitat quality for the Jackson moose herd. Key findings from Phase II of the study include:

- Winter habitat availability is *not* limiting the growth of this moose population.
- Summer forage nutritional quality was significantly *lower* in areas that burned during the 1988 Yellowstone fires than in non-burned areas, suggesting that large-scale and severe wildfires over 20 years ago have had lasting negative effects on moose forage quality in this area (Figure 28). These results are surprising and contrary to common knowledge of the effects of fire on plant nutritional quality.

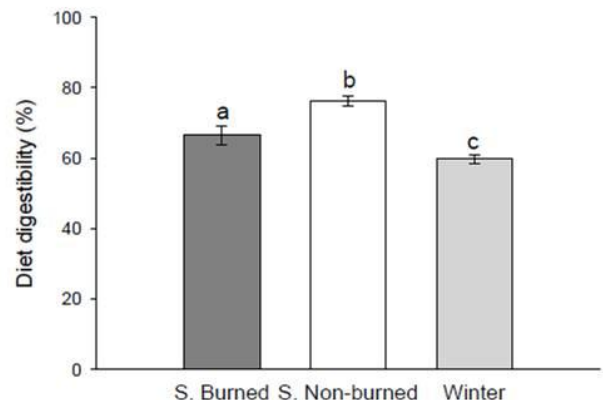


Figure 28. Diet digestibility (a measure of forage quality) for summer burned, summer non-burned and winter moose ranges.

- Pregnancy, neonate survival and calf survival rates were significantly lower for radio-collared cow moose that summered in burned areas than in non-burned areas (Figure 29), suggesting that poor summer nutritional quality in burned areas is impacting demographic rates.
- Population modeling based on over 6 years of data from 102 radio-collared moose indicated that this population is indeed declining and that the decline is most severe for the portion of the population that summers in burned areas (Figure 30).

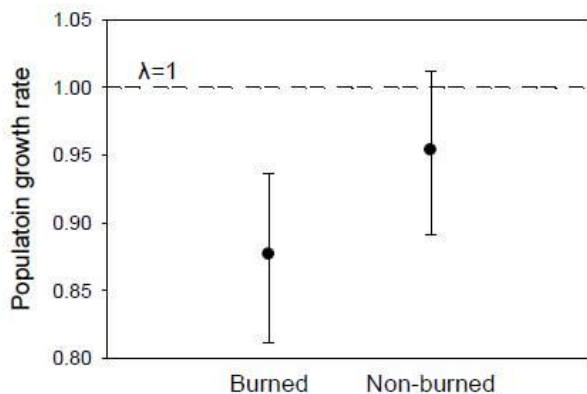


Figure 30. Population growth rates for moose population segments that summer in burned vs. non-burned ranges. Rates less than 1.0 indicate a declining population.

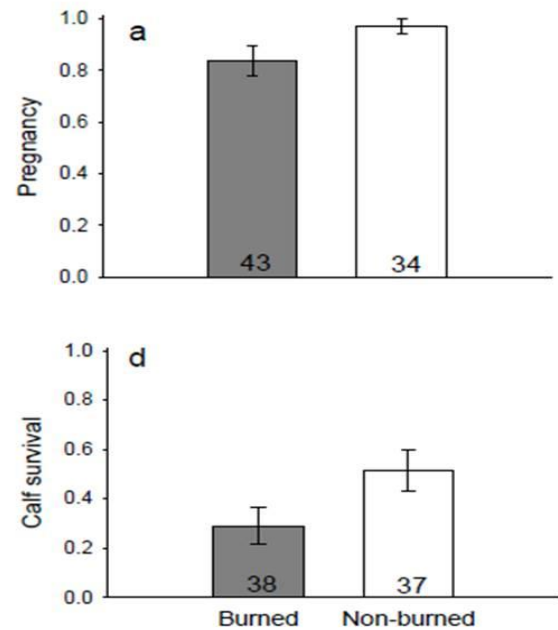


Figure 29. Pregnancy rates and calf survival rates for cow moose summering in burned habitats and non-burned habitats. Sample sizes of moose are shown inside the bars.

Additional information can be found in Vartanian's M.S. thesis, which is available from the Wyoming Cooperative Research Unit. Results from this project will directly inform the locations and types of future habitat enhancement projects in this area, as well as wildfire management.

Teton Bighorn Sheep Research (Goal 5) – Alyson Courtemanch

The Teton Range Bighorn Sheep Project was initiated in 2007 with the Wyoming Cooperative Research Unit at the University of Wyoming and master's student Alyson Courtemanch. The project was designed to increase knowledge about this small and isolated native "core" bighorn sheep herd. The herd resides year-round at high elevation in GTNP and on the Bridger-Teton and Caribou-Targhee National Forests. The population's future is tenuous, owing to its small size, isolation from surrounding herds and the combined effects of loss of historic winter ranges, habitat alteration due to fire suppression and threats posed by increasing backcountry recreation in and near important seasonal ranges. It is a collaborative project involving the WGFD, Wyoming Coop Unit, USFS, NPS, and the Teton Range Bighorn Sheep Working Group. Substantial funding has been provided by WGBGLC, WWSF, USFS, WGFD, NPS, NPS-UW Research Center, Greater Yellowstone Coordinating Committee, Teton Conservation District, and the Eastern Chapter of FNAWS.

The primary objectives of this study are to:

- Quantitatively assess the habitat selection patterns of the herd (in winter and summer);
- Quantitatively assess avoidance of winter habitats by bighorn sheep due to human recreation (i.e. skiing);

- Evaluate the effects of retiring domestic sheep allotments on the Teton Range bighorn sheep herd; and
- Determine lamb production and lamb survival to mid-summer for GPS-collared adult female sheep.

In winter 2008 and 2009, 28 bighorn ewes were captured and fitted with GPS-collars. The collars collected location data for 2½ years, documenting movements and seasonal habitat use (Figure 31). The collars automatically detached from the sheep in July 2010 and were collected from the field for download. The study also included three summers of field work to collect behavioral observations and diet information on bighorn sheep and two winter field seasons to collect data on human backcountry recreation patterns. During the winter field seasons, technicians contacted backcountry users at trailheads and asked them to carry GPS units to collect data on their movements.



Figure 31. GPS-collared bighorn ewes in the Teton Range.

Preliminary findings of the study include:

- This population appears to be stable, but with very low numbers (100-125 individuals). Pregnancy rates are high (~93%), lamb survival rate through late-summer is typical (~54%) and disease rates are very low for the herd. These very low disease rates indicate the herd has likely been isolated from surrounding herds for a long time.
- The majority of the eight mortalities of GPS-collared bighorn sheep during the study were due to avalanches. Other causes of death were mountain lion predation and unknown. During some years, winter mortality from avalanches may play a role in limiting population growth.
- Since the herd has abandoned its historical migration routes to low elevation winter range, it now relies on small, isolated, wind-swept ridgelines and slopes at high elevation to survive the winter. The scarcity and poor quality of winter habitat is likely limiting the growth of this population.
- GPS-collar locations confirmed that bighorn sheep are utilizing former domestic sheep allotments on the west slope of the Teton Range. These seem to be particularly important areas during late winter/early spring and throughout the summer (Figure 32).

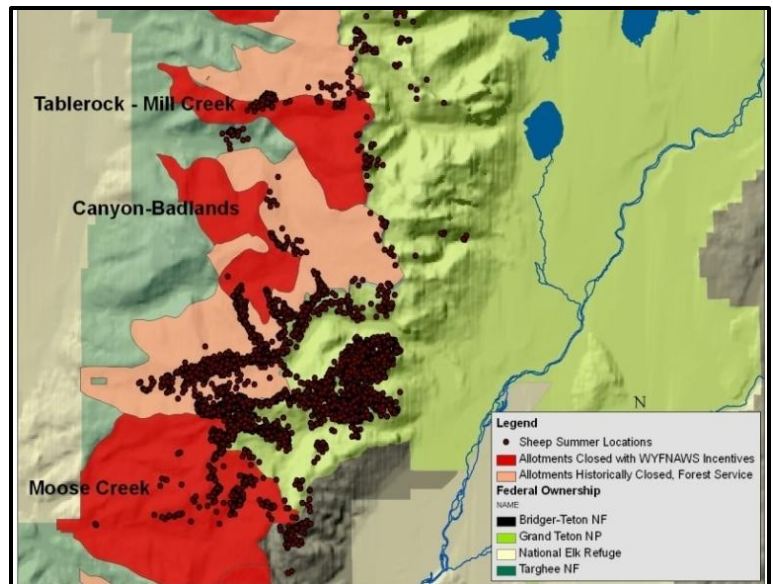


Figure 32. Summer locations of GPS-collared bighorn sheep in former domestic sheep allotments in the Teton Range. The red areas are allotments that were closed with WWSF incentives and the pink areas are allotments historically closed by the Forest Service.

Currently, Courtemanch is finishing data analysis and compiling the results of the study, including analyzing the impact of winter backcountry recreation on bighorn sheep habitat use. The final thesis and report is expected to be completed in summer 2012. Results from this study will directly inform future habitat treatments in the Teton Range to improve bighorn sheep habitat, as well as wildfire management.

Horse Creek WHMA Emergency Stream Restoration (Common Goals) – Seth Roseberry, Kade Clark, Matt Miller, Ray Bredehoft, Lara Sweeney Gertsch

Horse Creek changed its channel pattern due to high runoff and flooded a side channel (Figure 33). Bank erosion threatened a fenceline and the property of a downstream landowner. An instream channel project was designed by the Aquatic Habitat Biologist and constructed by the Habitat and Access Maintenance Crew. The instream structures directed the flow back to the original channel and the fence was modified (Figure 34). Future management plans will be developed with the H&AM Crew.



Figure 33. Horse Creek changed channel pattern and flooded a side channel during the 2011 spring runoff.



Figure 34. The new instream structure diverted flows to the main channel and by fall 2011 the eroding side channel was abandoned.